The Refrigeration Service Engineer

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No. 7

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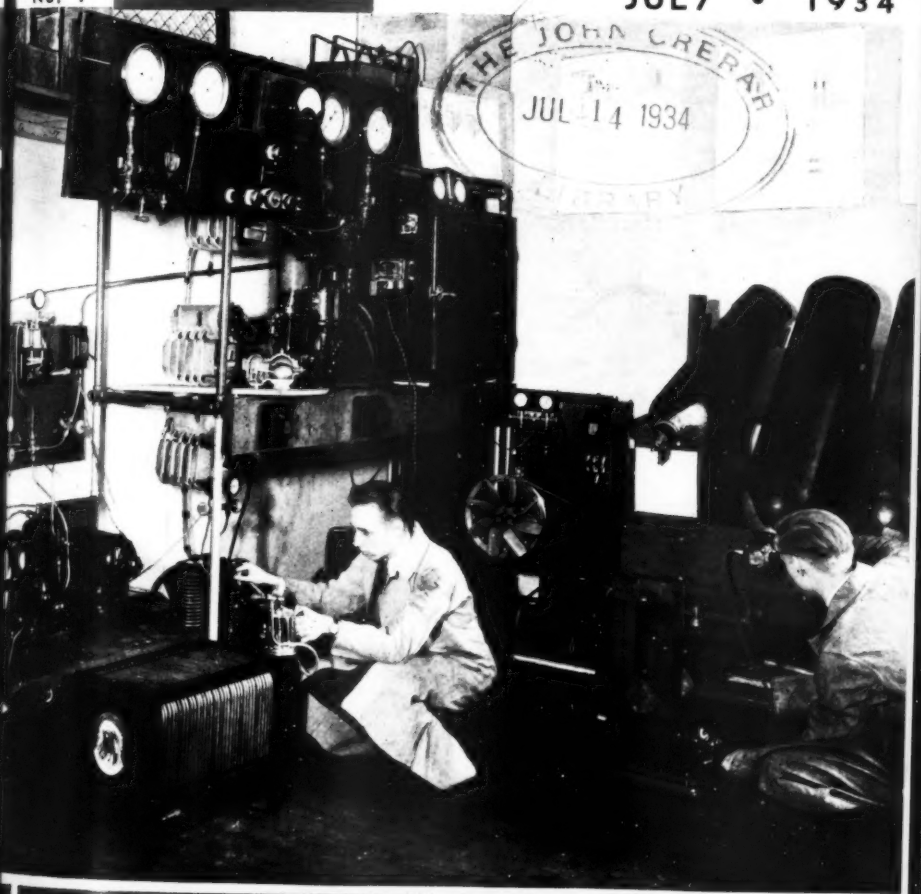

The Crosley Refrigerator—Making Records Pay—Refrigerant Controls
The Question Box—Remedy Chart

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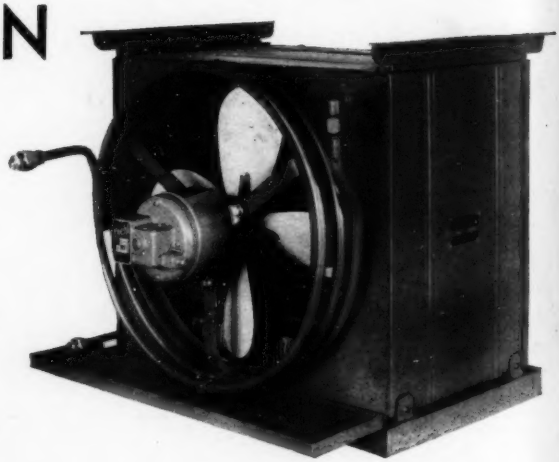

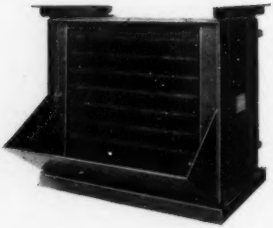

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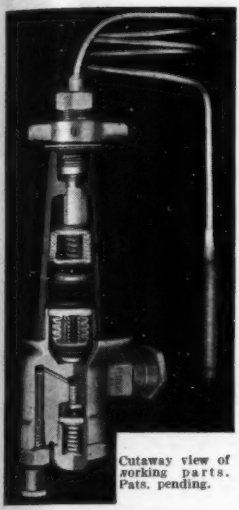

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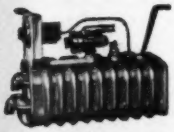

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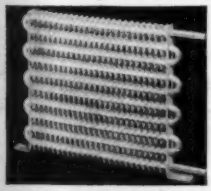

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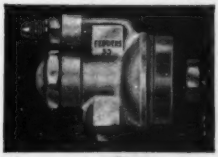

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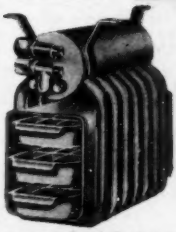

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The REFRIGERATION SERVICE ENGINEER

Devoted to the Servicing of
REFRIGERATION UNITS *and* OIL BURNERS

VOL. 2 JULY, 1934 NO. 7

Table of Contents

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A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

OFFICIAL ORGAN REFRIGERATION SERVICE ENGINEERS' SOCIETY

VOL. 2, NO. 7 CHICAGO, JULY, 1934 $2.00 per Annum

The Crosley Refrigerator

A Popular Priced Refrigerator of the Conventional Single Cylinder Reciprocating Type. Service Suggestions. Construction Features.

THE Crosley Refrigerator is one of the popular priced models on the market today, and is manufactured by the Crosley Radio Corporation of Cincinnati, Ohio. This particular refrigerator is familiarly known as the Crosley Shelvador because of the additional space provided in the door of the refrigerator in its shelf arrangement.

The Crosley compressor is of the conventional single-cylinder reciprocating type, cut-away and end view of which are shown in Figure 1. Shut-off valves are provided on the compressor on the suction side and discharge side of the line. The compressor capacity at zero gauge with 100° F. room temperature ranges from 100 I.M.E. to 110, depending on the various models. In the 1932 and 1933 models, a ⅛ h. p. repulsion induction 110 volt, 60 cycle motor is used on the 3½ cubic foot model, and a ⅙ h. p. motor, of the same type on the 4½ cubic foot and 6 cubic foot models. In the 1934 model, a ⅙ h. p. motor is used on all except the largest unit of 7.05 cubic foot capacity, which uses ⅕ h. p. motor.

Condenser start motors are furnished on all 60 cycle, 110 volt units. Repulsion induction motors are used for all other frequencies and voltages except for direct current, where a compound wound D. C. motor is used. The compressor speed is 540 r.p.m. for all of the models except the large one, which is 600 r.p.m. The compressor bore is 1½", and the stroke 1⅜". The refrigerant used is SO_2, and the charges of the various models in ounces is shown by the following table.

SO_2 Charge for Crosley Refrigerator Units

Unit Model No.	Year	Type of Evaporator	SO_2 Oz. by Wt.
14	1932	Dry Bottom	34
16	1932	Dry Bottom	27
20	1932	Dry Bottom	21
25	1932	Dry Bottom	21
29	1933	Dry Bottom	27
29	1933	Wet Bottom	31
30	1933	Dry Bottom	31
30	1933	Wet Bottom	31
33	1933	Dry Bottom	34
33	1933	Wet Bottom—Plain Plug	37
33	1933	Wet Bottom—"E" Plug	26
35	1933	Dry Bottom	28
35	1933	Wet Bottom	31
640	1934	Wet Bottom—Plain Plug	34
641	1934	Wet Bottom—Plain Plug	37
641	1934	Wet Bottom—"E" Plug	26
641	1934	Wet Bottom—"G" Plug	29
642	1934	Wet Bottom—Plain Plug	40
642	1934	Wet Bottom—"E" Plug	29
642	1934	Wet Bottom—"G" Plug	32

Unit Model No.	Year	Type of Evaporator	SO_2 Oz. by Wt.
643	1934	Wet Bottom—Plain Plug	.34
644	1934	Wet Bottom—Plain Plug	.31
652	1934	Wet Bottom—Plain Plug	.37
652	1934	Wet Bottom—"E" Plug	.26
652	1934	Wet Bottom—"G" Plug	.29
655	1934	Wet Bottom—Plain Plug	.31

Dry Bottom evaporator has capillary tube entering evaporator at top. Wet Bottom evaporator has capillary entering at bottom. "Plain Plug," "E Plug," etc., have reference to marking on capillary plug.

The crank case of the compressor should contain about 10 ounces of Suniso lubricant. The seal on the compressor is of the diaphragm type.

The condenser is a conventional fin tube type condenser, McCord and Bush are both used.

The evaporator is a Crosley make, shell type construction of steel.

Cold Control and Safety Switch

The temperature control is a thermostatically operated switch and Crosley refrigerators have used four different makes of temperature controls. These controls are Ranco

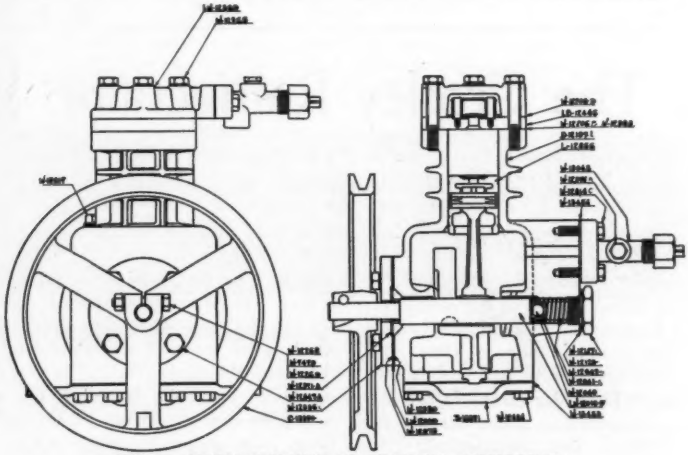


FIG. 1. CROSS SECTION OF CROSLEY COMPRESSOR.

Service Chart for Capillary Tube Units

Effect Of On	Shortage Of SO2	Plugged Capillary Tube	Air In System	Over-Charge Of SO2	Leaky Head OR Piston Valve	Loose Control Bulb	Discharged Control Bulb	Seal Leak
Refrigeration	Poor	None	Normal Unless Head Pressure Is Very High	Poor	Normal Poor If Too Bad	Too Cold	———	Depends On Head Pressure
Head Pressure	Low	Very High	High	High	Low	———	———	High Due To Air
Back Pressure	Low	High	Normal Unless Head Pressure Is Very High	High	High	———	———	Depends On Head Pressure
Suction Line	Warm	Warm	Warm	Frosted	Warm	———	———	Warm
Vibration	Normal	Bad	Depends On Head Pressure	Depends On Head Pressure	Normal	Normal	———	Depends On Head Pressure
Temperature of Condenser	Normal	Cool	Hot	Hot	Normal	———	———	Hot
Cycle	Probably Continuous	Thermal Relay Kicks Out	Runs Too Long	Runs Too Long	Runs Too Long	Continuous Or Runs Too Long	Will Not Start	Runs Too Long
Wattage	Low	Very High	High	High	Low	Normal	———	High

Example: The effect of an overcharge of SO-2 on the suction line is a frosted condition of the line.

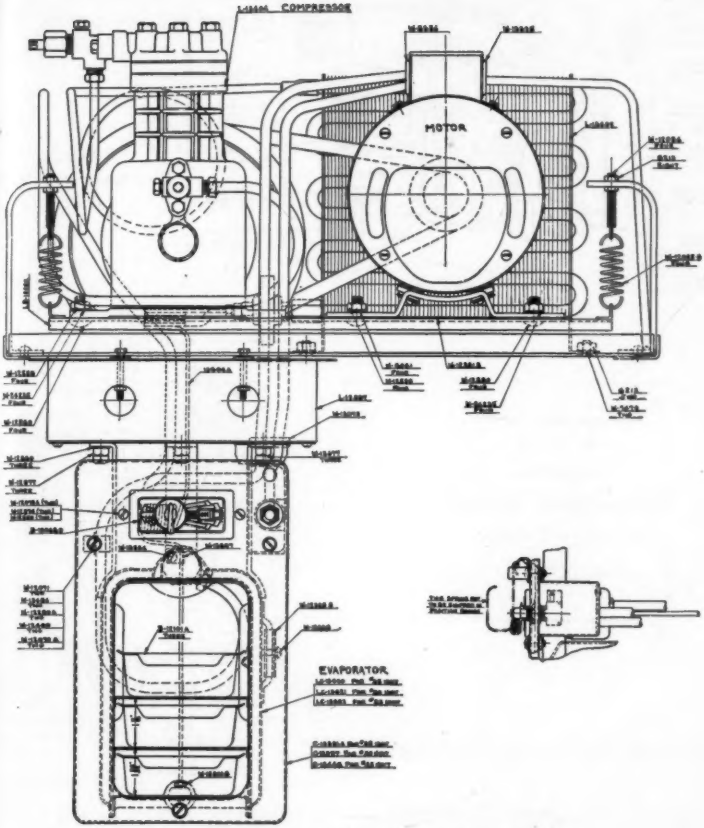


FIG. 2. CROSS SECTION OF COMPLETE CROSLEY UNIT.

Type "D" and Type "F," Tagliabue Type "R-8" and "R-18," Cutler-Hammer Type "C," and General Electric Type "G-21." The safety switch consists of a spring contact, which is held in place by a low melting alloy in the cup. A coil of wire near the cup melts the alloy if too much current is drawn through the circuit. The switch is then released and opens circuit.

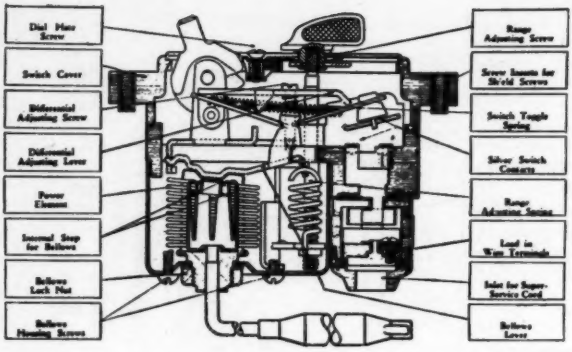
Shut Off Valve

The suction shut off valve is a two-way valve with a double seat, so that a compound gauge or a charging line may be connected without the loss of any refrigerant.

Temperature Control and Safety Switch

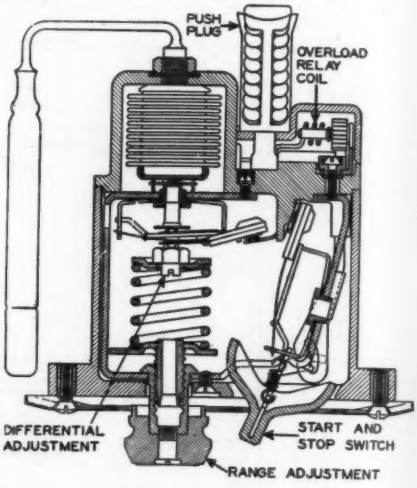
There is little chance of trouble developing in these two units. If trouble does develop, check setting, as well as thermal bulb for loss of charge, and see that the thermal bulb is fastened securely to evaporator.

On 1933 and 1934 units, the capillary tube is connected to the filter and evaporator. On 1932 units, the lower end of the capillary tube is soldered into the evaporator.

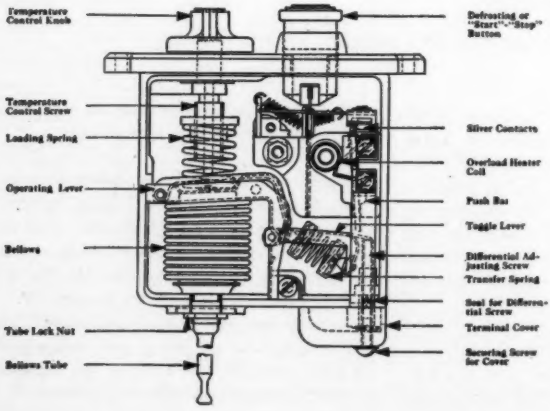


RANCO TEMPERATURE CONTROL.

Types of Temperature Controls Used on Crosley Refrigerators



TAG SNAP-ON TEMPERATURE CONTROL.



CUTLER-HAMMER TEMPERATURE CONTROL.

Crosley Electric Refrigerator Trouble Chart

Trouble	Possible Causes	Remedy
Unit Does Not Run	1. Defrosting and Safety Switch out.	1. Push in switch button.
	2. Power off at socket.	2. Test with a voltmeter or lamp.
	3. Fuses blown.	3. Replace.
	4. Open in electric circuit.	4. Test with a voltmeter. Repair.
	5. Belt too tight, broken or slipping.	5. Repair as required.
	6. Condenser shut-off valve closed.	6. Open it as far as possible.
	7. Compressor "stuck up."	7. Remove unit and repair it at the shop.
	8. Thermostat inoperative.	8. Check setting also charge in bulb and repair, if possible at shop, if not, replace with good control.
Unit Runs But Does Not Refrigerate Properly	1. Suction shut-off valve closed.	1. Open it as far as possible.
	2. Cabinet too close to wall.	2. See that cabinet is 2" from wall.
	3. Belt slipping or broken.	3. Repair as required.
	4. Part of charge lost.	4. Test and recharge if necessary.
	5. Air in system.	5. Test with gauge. Purge as necessary.
	6. Piston valves or head valves inoperative.	6. Test and repair as described in servicing instructions.
	7. Thermostat inoperative.	7. Replace and repair in shop.
Cabinet Too Cold	1. Temperature control set for too low a temperature.	1. Set for higher temperature (No. 1 is highest, No. 8 is lowest temperature setting).
	2. Temperature control inoperative.	2. Replace. Repair in shop if practicable.
Cabinet Too Warm	1. Temperature control set for too high a temperature.	1. Set for lower temperature (No. 1 is highest, No. 8 is lowest temp.)
	2. Cabinet overloaded with food or water so as to block air circulation, etc.	2. Arrange so that air circulates freely.
	3. Doors of cabinet left standing open for long periods.	3. Caution user to keep doors closed.
	4. Cabinet door does not fit tight.	4. Adjust or replace gasket or lock.
	5. Cabinet too close to wall. Shut in conditions.	5. Set cabinet 3 inches from wall.
	6. Suction shut-off and condenser shut-off valves not entirely open.	6. Run back valves until they seat firmly in the open position.
	7. Belt slipping.	7. Tighten as required.
	8. Charge partially lost.	8. Test as described in servicing instructions. Add charge if necessary.
	9. Inoperative piston or head valves.	9. Reseat or replace valves.
	10. Air in system. See also: "Ice Freezes Quickly."	10. Test with gauge. Purge as necessary.
Ice Cubes Freeze Too Slowly	1. Temperature control not set at cold enough position.	1. Check cold control setting using pencil type thermometer next to thermo bulb of cold control. Set controls to cut on between 29° and 30°. Cut off at 15° set on No. 1 position. Set control at colder position.
	2. Warm water used in freezing trays.	2. Caution owner to use cool water.
	3. Poor contact between tray and evaporator.	3. Check Ice Trays. See if good contact is being made with evaporator.
	4. Refrigerator located in too cold a place.	4. Locate cabinet where the atmospheric temperature will not go lower than about 60° F.
Unit Runs Continuously	1. Temperature control set for too cold a temperature.	1. Set control for higher temperature.
	2. Refrigerator overloaded with food and water.	2. Remove excess food and water.
	3. Doors left open.	3. See that doors are kept closed as much as possible.
	4. Inoperative temperature control.	4. Replace. Repair in shop if practicable.
	5. Thermostat bulb not in proper contact with evaporator.	5. Repair. Tighten thermo clip and check cold control setting.
Bad Odors	1. Spoiled Food.	1. Remove food and clean cabinet thoroughly with soda water.
	2. Belt burning because it is too tight.	2. Loosen belt.
	3. SO_2 Leak. (Odor similar to that of burning sulphur.)	3. Test for leaks using strong (26%) aqua ammonia. Repair and recharge if necessary.
Uses Too Much Electricity	1. The owner may be neglecting the necessary details of operation such as: allowing warm foods to cool before placing them in the cabinet, using only cool water in ice trays, keeping the cabinet door closed whenever possible, setting the cold control for a normal operating temperature. If refrigerator is running warm or unit is operating continuously, refer to the following headings: "Refrigerator Runs Too Warm," "Unit Runs Continuously."	1. Caution owner about the operational features.
Defrosting And Safety Switch Will Not Stay In	1. Line voltage too low.	1. Check with voltmeter.
	2. Inoperative safety switch.	2. Replace. Repair in shop if practicable.
Ice Freezes Quickly But Food Spoils	1. Unit needs defrosting.	1. Defrost whenever ice collects to thickness of ½ inch.
	2. Placement of food stops air circulation.	2. Re-arrange food. Do not fill refrigerator shelves too full.
	3. Low charge.	3. Test for low charge and add charge if necessary.
Noisy	1. Hold down bolts not removed.	1. Remove bolts.
	2. Squeaks because motor bearings need oil.	2. Oil motor bearings.
	3. Knocks due to oil in system, or overcharge.	3. Remove oil from system or purge SO_2.
	4. Improper adjustment of suspension springs.	4. Adjust support screws. Replace defective springs.
	5. High discharge pressure because of air in system.	5. Purge.
	6. Belt slap.	6. Align motor.
	7. Tubing contacts.	7. Bend tubing apart.
	8. Fan blade bent.	8. Remove fan and straighten.
	9. Compressor or Motor loose on sub base.	9. Tighten bolts. See that cardboard plate is under motor.
	10. Spring noisy.	10. Loosen retainer nuts on spring adjustment studs, turn spring and tighten nuts.

Compiling the Saturation Chart

This Article Explains the Method of Determining the Approximate Temperature Relationship of Various Refrigerants

By HERBERT HERKIMER

THE Saturation Chart, published in the April, 1934, issue of THE REFRIGERATION SERVICE ENGINEER, page 27, tabulates in a systematic form, pressures which correspond to temperatures of any liquid enclosed in a sealed system or container, the liquid being in contact with its vapor, the liquid being chemically pure and the system being free from foreign vapors.

The service man is interested in liquids called refrigerants and for convenience the Saturation Chart is divided into two sections. The evaporator section gives usual conditions met with in practice in evaporator usually never above 40°. The condenser section gives the condition usually met with in practice on the high side. Rarely is the condensing medium lower than 50°.

How to Compile a Saturation Chart

The Saturation Chart is not as complicated as it may seem, neither is it so difficult to obtain the approximate pressure temperature relationship. For instance say it is desired to obtain a pressure temperature relationship of sulphur dioxide for four different conditions, as for example, zero, 32° F., 70° F. and 100° F. The procedure required is to make experiments. The equipment required for the experiments is shown in diagrams Fig. 1 to 4.

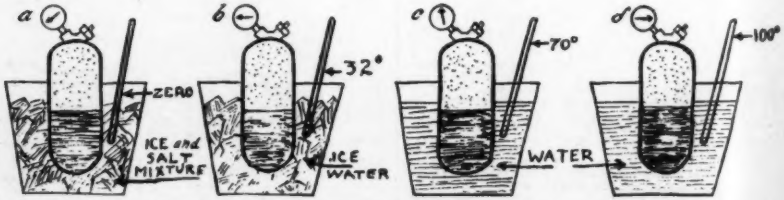
Fill a bucket with an ice and salt mixture into which place a steel drum from which all foreign gases and air have been removed by a vacuum pump. Partly fill drum with liquid sulphur dioxide. The upper part of drum as shown in dotted lines in figures will contain vapor. Place a Fahrenheit thermometer in solution in bucket. More accurate results will be obtained if the temperature of solution in bucket is maintained constant and enough time is allowed for the liquid in the drum to arrive at a temperature equal to the temperature of the solution in the bucket.

Experiment A

It will be discovered that if zero liquid is obtained in the drum the gauge attached to drum will show 9 in. vacuum which corresponds to saturation chart data.

Experiment B

A 32° temperature liquid in drum will develop a pressure of about 9 lbs. Chart 42 shows that a 30° liquid develops 7 lbs., while a 40° liquid develops 14 lbs. It is necessary to estimate intermediate temperatures if not given on Chart 42. More elaborate charts have been compiled giving all temperatures but they are too clumsy for the service mechanic to carry around.



FIGS. 1 TO 4. DETERMINING PRESSURE RELATIONSHIP.

Experiment C

A 70° liquid in the drum will develop 35 lbs. pressure.

Experiment D

A 100° liquid in the drum will develop 70 lbs. pressure.

Experiments may be made on other refrigerants to determine the pressure corresponding to the temperature. The pressure temperature relationship obtained in practice will vary slightly from the saturation chart due to the fact that the mixture circulated consists of about ⅓ lubricating oil and ⅔ refrigerant which will give a slightly higher temperature varying from 5 to 10° above, the temperature corresponding to the pressure given in Saturation Chart. For instance if the pressure reads 5 lbs. of methyl chloride the temperature instead of being zero as shown in Chart will be 5 to 10° higher, depending on percentage of oil in solution in refrigerant.

S S S

BEER COOLING TIPS

THE following suggestions on beer cooling are made by the Temprite Products Corpn., manufacturers of Temprite Coolers.

Kegs placed in the tapping room should be allowed to stand for 12 to 24 hours and in a great number of cases it is most advisable to "bleed" the keg of its excess gas by loosening the packing nut at the top of the tap rod. If the keg is not "bled" of excess pressure the pressure gauge reading at CO_2 drum or air compressor will not be indicative of the true pressure on the beer in the keg. After this gas is released then the proper pressure should be applied to the keg and the entire system, either with the automatic pressure maintaining valve if CO_2 is used or by the pressure maintaining device if air is used. If a keg of beer is allowed to stand open to atmosphere or without pressure it will become "flat" and unfit for use. Beer in this condition should never be used as it will repel customers.

After beer is run through a pipe for a certain period of time it has a tendency to deposit a cereal sediment on the interior pipe surface. The warmer the beer in the pipe the faster this sediment accumulates, and the thicker becomes the layer of sediment on the inner surface of the coil. It therefore is necessary to clean out beer pipes in order to remove this film or sediment, otherwise the beer will have a bitter taste. In preprohibition days no better method was known to clean coils than with live steam or hot water, which had to be done once a week. This proved quite unsatisfactory because of the fact that the live steam "baked" the sediment on the surface of the coil and then later this sediment was drawn out with the cold beer in flakes which indicated to the customer that the beer was either bad or served through an unsanitary cooler. If the entire coil, pipe assembly and kegs are kept at a uniform, low temperature at all times cleaning becomes necessary only at rare intervals—once every two to four weeks. This, however, can best be determined by the dispenser himself. In preprohibition days when the coils were cleaned it was necessary to waste the total amount of beer in the coils, which of necessity were long, varying from 50 to 200 feet, and held considerable beer.

As has been the case in other lines, great improvements have been made in methods of cleaning beer coils since 1916. Today a new method and the one most commonly used is a solution of cold water mixed with sal soda or other chemical cleaner. This not only removes all film and impurities, as well as bacteria growth on the interior of the coils, but flushes out the deposits and leaves the coil sweet and clean. A great number of brewers in all parts of the country approve the use of the chemical method and in some cases will not permit the use of steam cleaning.

S S S

A. B. Conklin,
Massachusetts.

I notice that you have passed the first milestone in the publication of The Refrigeration Service Engineer. You have done good work and keep it up. It is the service man's own paper.

Making Records Pay

Keeping Records Should Not Be a Puzzling Job—If Proper System Is Adopted. In This, the First of a Series of Articles, the Author Points Out the Value of Systematized Records for the Refrigeration Servicing Business.

By J. B. COOK *

THIS first article is addressed to the man starting up in the business of refrigeration service. It is addressed to you as a beginner. Later on we shall talk to the man who has worked up some business and requires help to carry on, but let's start at the beginning with the man who has just entered this important field of service. To you this article is directed.

The man who has learned the business of refrigeration service is entering a rapidly growing business. His first resolve is to give good service and build up a clientele that is well pleased with good work. This is a great opportunity today.

This new business man is entirely familiar with all the tricks of the refrigerating machine. They are no strangers to him.

But when it comes to keeping books, records, tickets, bills, that is usually a new deal and the first reaction, which, by the way, is not entirely a bad reaction, is to keep just as few records as possible. The old idea was that records were a nuisance and a necessary evil. Overhead expense was something to be avoided as much as possible. I am going to agree with the old-fashioned view, but in a new way.

The fact is that records should be avoided when they are not necessary and the necessary records should be made just as convenient and efficient as possible. Useless fussing with useless information can be and should be avoided. Distinguish, please, between useful brief records conveniently handled and the old style of detail and long-way-round methods of running the office. These, we hope, will soon be gone forever.

What is the very minimum of records that you really must keep in order to run your business? You, who have set up your own office must take one of these positions.

Permit me to introduce three new business men just starting up their own offices. The first says: "I will keep as few records as I possibly can." 2. "I will pay no attention to records except where absolutely necessary." 3. "I want convenient records that will make me profits."

The first business man will keep everything in his head, as much as possible. He will do a cash business for he can and will build up his business by rendering the very best of service. His business ought to grow. Some time ago I heard of a prosperous merchant who did a large business and his friends and customers remarked with amazement, "He carries everything in his head." He hated books of account and he knew how much A, B and C owed him, how much he owed—and his mind was simply a living picture of his business and his financial accounts. This continued for quite a while until one day he slipped. Ill health or accident or something extraordinary broke into his wonderful mental moving picture and it stopped. His business had no adequate records and it stopped. When he was ready to continue, there seemed to be no starting point. He was done for.

This is an extreme case, but a true one and it shows that up to a certain point a man can carry things in his head if he has an excellent memory. Had I talked with that party who considered accounts quite unnecessary, I should have asked him whether he did not think he could use his mental powers better in getting new busi-

* Jonathan Cook & Company, Certified Public Accountants, Chicago. Mr. Cook is the author of many articles and books on accounting methods and has had many years' experience in devising accounting methods for various businesses.

ness than in memorizing a tremendous amount of detail that should have been all written down and when he came to a stopping of his mind temporarily, his fatal blunder proved the end of his success. It did illustrate, however, that a bright mind can carry a good deal and that is what some business men really ought to do today, but they never know unless they change their ways, how much more profitable that energy, put into the memory of details would produce in profits had they applied it more progressively.

Keeping Records

Our second new business man will pay no attention to records except where he is forced to. You will find him probably doing very good work and likely he has some very good customers, but how can he do any big jobs such as servicing apartment buildings or any job that takes a long time or how can he handle some very good customers who are accustomed to charge accounts? Here he will go lame unless he has some real records. Some customers he may overcharge, new customers he may forget to charge at all, many customers (if he has them) he will probably charge too little and when they make a claim or complaint, he will not be able to hold up his side of the case because he has insufficient records. He is more apt to get into a row with a customer than he would be if had kept an actual accurate record and both the customers and those he buys from are going to find out pretty soon and some of them will take advantage of this weakness in his business.

The third new business man, you may guess, obviously, is the man who may not make so much money at the start and whose business may perhaps not grow quite so rapidly as that of his business neighbor, who will not waste, as he says, any time on keeping records. But our third new business man is going to know what he is doing and in knowing, he is going to govern himself accordingly and to change his policy when it proves unprofitable, and to enlarge his business as rapidly and safely as he can. Pretty soon he will want some help in his office. Perhaps, friend wife knows something about records, or some young man who is studying accounting at night school may come in and help him out.

He is going to eliminate all unnecessary records, all duplication of effort, filing is going to be simple, records of each job will probably be kept altogether from start to finish or if he has a large customer, such as a building manager for whom he performs a great deal of work, he is going to keep his records in such shape that he can refer to them and get the whole story quickly when he wants it. Convenience in records will help him to bill promptly and that is half of collecting promptly.

The old systems of filing, copying each letter, putting bills in one place, correspondence in another, incoming letters in a third place, complaints in a fourth place, etc., etc., is gone forever and he is going to have right within his grasp at any moment, the complete record of the job and probably also the customer. This sort of record is going to save loss on a lot of accounts that would otherwise be undercharged or forgotten altogether. An accountant whom I know told me of a case where he found so many customers accounts that had gotten out of sight and had not been properly billed and followed up that it changed a loss and shortage of money into a gain and a very encouraging business statement. A man who has such a system of convenient records cutting out all duplications and making them concise and convenient and readily accessible, will probably find, before long, that he needs additional help. The business will grow beyond his own personal ability to take care of it and then business organization must grow accordingly. In my next article I plan to present two very simple forms, one to take care of orders as they come in and the other to see that they are billed and not lost sight of. This is the revenue end of the business. Later on, I shall offer forms to help keep track of time and materials.

S S S

F. Henry
Oklahoma

This is a renewal and I like your magazine fine. Several of the published charts are each worth the yearly subscription price.

The Control of Refrigerants . . .

ARTICLE NO. 11
THE
ELECTRICALLY
OPERATED VALVE

Two Types of Electrically Operated Valves Are Used to Automatically Control Refrigerants—the Magnetic or Solenoid Valve and the Motor Valve.

By J. L. SHRODE *

THERE are two types of electrically operated valves used in the automatic control of refrigerants, the magnetic or solenoid valve and the motor valve. The magnetic valve is operated or by the movement of a magnetic plunger or core in a solenoid, and the motor valve is operated by a small motor and a train of gears.

A solenoid is a coil of wire wound around a magnetic metal frame so that there is an opening or air gap in the center. When an electrical current is passed through such a coil, it acts as an electro-magnet. The magnetism created by the flow of current through the coil draws a metallic plunger into the center of the coil. When the current is shut off, the plunger drops out of the coil due to gravity. The motion of this plunger is used to operate a valve either directly or indirectly.

There are several types of magnetic valves used in the automatic control of refrigeration. Those to be discussed include the liquid refrigerant stop valve and the suction line stop valve.

Magnetic Liquid Stop Valve

The magnetic liquid stop valve (Figure 1) is a tight closing valve used on high pressure liquid refrigerant lines. It is used in conjunction with a thermostat for automatic temperature control, with a float switch for liquid level control in flooded systems, or with a push button switch for remote hand control. Since this valve does not vary the amount of flow but has only two positions, full open and tight closed, it is frequently used in conjunction with the regulating type valves such as the thermostatic expansion valve and the constant pressure expansion valve.

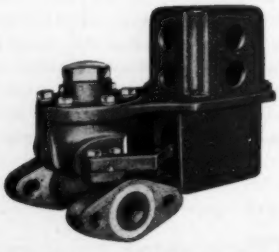


FIG. 1. MAGNETIC LIQUID STOP VALVE.

Construction

Figure 2 shows a sectional view of one design of magnetic liquid stop valve. This valve is of the lever type and the motion of the solenoid plunger operates the valve indirectly. The plunger is pivoted to a lever which is keyed to the operating shaft of the valve. A cam attached to this shaft opens and closes the valve by moving the valve pin in and out of the valve seat. This cam fits between two shoulders on the valve pin and translates the rotary motion of the shaft to the valve pin. The valve opens against

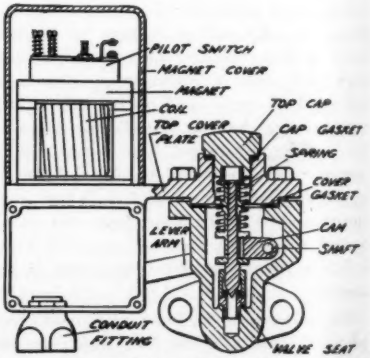


FIG. 2. SECTIONAL VIEW OF MAGNETIC LIQUID STOP VALVE.

* President, Alco Valve Co., St. Louis.

the pressure of a spring on top of the valve pin. This spring pressure and the weight of the plunger hold the valve closed, stopping the refrigerant flow, when the circuit to the valve is broken. When the coil is energized the plunger is pulled up into the center of the solenoid and makes a firm contact on the pole face of the laminated solenoid frame. As the plunger travels upward it opens the valve and when it reaches the frame, the valve is wide open. As long as current is passing through the coils, the plunger is held in this position in the center of the solenoid and the valve remains open. When the coil is de-energized the plunger drops out of the solenoid and closes the valve by its own weight and the assistance of the top spring. The plunger does not drop completely out of the solenoid but remains partially in the guide in the center of the solenoid.

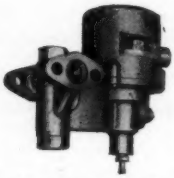


FIG. 3. PACKLESS MAGNETIC LIQUID STOP VALVE.

In some magnetic liquid valves a pilot switch which is operated by the plunger, is provided in the magnet housing. (See Figure 2.) In the valve illustrated, when the magnet coil is energized the plunger is pulled up into the solenoid and forces a small pin in the top of the solenoid frame against a contact arm which closes the pilot switch. When the valve is de-energized and the plunger drops down, this pin also drops and the switch is opened. Then when the valve opens, this switch is closed and completes an electrical circuit and, conversely, when the valve closes this switch opens the circuit. The purpose of this pilot switch will be discussed later.

A packless type magnetic liquid stop valve for small capacities is illustrated in Figure 3. A sectional view of this valve is shown in Figure 4.

In actual operation a thermostat wired in series with the magnetic valve coil operates the valve by making and breaking the circuit to it. The valve is open when current is passing through the coil and closed when the circuit is broken. The pilot switch is wired in series with the holding coil of the magnetic starter on the compressor motor. This switch then starts and stops the compressor as the magnetic valve opens and closes and in this manner the compressor only operates when refrigeration is needed. This pilot switch eliminates the need for a double pole thermostat.

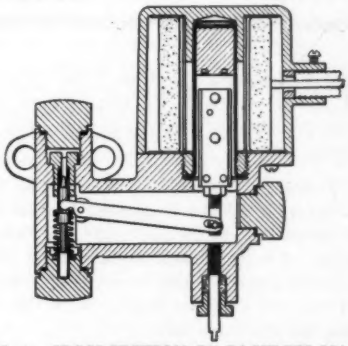


FIG. 4. CROSS-SECTION OF PACKLESS MAGNETIC LIQUID STOP VALVE.

The pilot switch serves the double purpose of preventing the compressor from running if, for any reason, the stop valve should fail to open and of providing a time lag between the opening of the magnetic valve and the starting of the compressor motor. The blowing of a fuse in the magnetic valve circuit might cause the compressor to pump a vacuum if it were not for the pilot switch. With the switch, the opening of the magnetic valve is not affected by the drop in voltage due to the starting of the compressor motor since the motor will not start until the valve is fully open. When more than one magnetic valve is used on a system the pilot switches are connected in parallel. As long as one valve is open the compressor will run and when all of the valves are closed the compressor shuts down.

Let us consider an installation where the compressor is operating on two rooms fed in multiple and where magnetic liquid stop valves are installed in the feed lines to each room. There is a thermostat in each room

(Continued on page 17)

THE Question BOX

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

THE following questions have been referred to Mr. R. L. Hendrickson, 2nd Vice-President of Chicago Chapter, and his replies follow:

Question 47. As a subscriber to THE REFRIGERATION SERVICE ENGINEER, I would like to know the following: (1) The boiling points of refrigerating gases. (2) A Grunow refrigerator which I have been working on does not make ice cubes. Is that a sign that the charge is lost?

ANSWER. (1) The boiling points of the various gases at atmospheric pressure °F. are as follows:

Sulphur Dioxide	14.00
Carbon Dioxide	—108.4
Ammonia	—28.0
Methyl Chloride	—10.66
Dichlorodifluoromethane (Freon) (F-12)	—21.66
Butane	33.08
Isobutane	13.6
Ethyl Chloride	53.96
Ethane	—26.9
Propane	—48.1
Ethyl Ether	94
Chloroform	142.16
Carbon Tetrachloride	170.24
Methylene Chloride	105
Methyl Bromide	38
Methyl Formate	89.5
Carrene	105

(2) It does not necessarily follow that if you cannot freeze ice cubes, it is a definite sign that the charge is lost. There is a possibility that the system is air bound, thus preventing sufficient refrigerant from passing through the floor into the evaporator, or causing the pressure differential between the high and low side to increase until the compressor is not performing its duty efficiently.

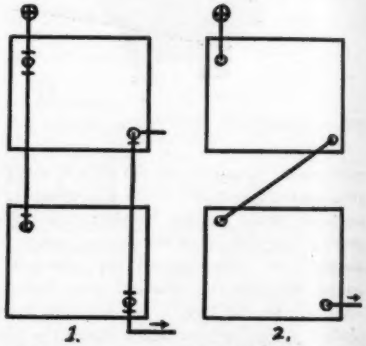
Question 48. In an absorption system where water is used in the refrigerator, what are the chemicals besides ammonia that are used and why? Can you give me the ice melting equivalent data on the Electrolux refrigerator?

ANSWER. Hydrogen to cause a drop in the partial pressure of the liquid ammonia as it enters the evaporator. The ammonia might be said to "diffuse" with the hydrogen following the law of Dalton's relative to partial pressures.

About .2% of potassium dichromate is also added to the complete charge to prevent disassociation of the ammonia into its two elements (nitrogen and hydrogen).

The capacities of the various Electrolux models run from 50 pounds M.I.E. to 125 pounds M.I.E.

Question 49. On a Wayne double brine tank refrigerator, the tanks are located one above the other and connected in parallel, as shown in Fig. 1. Why does one tank freeze and the other not? I might state that there is sufficient gas in the machine. Would it be advisable to connect the tanks in series? Would you get better results? Would there be any difference in back pressure?



FIGS. 1 AND 2. CONNECTIONS FOR A WAYNE DOUBLE BRINE TANK.

ANSWER. A series hook-up, illustrated in Fig. 2, is by far the most satisfactory because there is no chance of refrigerant short circuiting through one coil. The parallel hook-up, Fig. 1, would work if the tanks

were on the same level and if they had the same resistance to the flow of refrigerant. However, it is commercially impossible to manufacture coils of identical characteristics.

Another thing to bear in mind when installing two tanks is to place them so that each tank is exposed to the same temperature of air (place side by side). The top tank on a vertical installation does most of the work.

THE following question was referred to Mr. George H. Clark, chairman of the National Educational and Examining Board and his reply follows.

Question 50. On a Peerless multiple system (full flooded) with riser extending up four floors feeding eight evaporators, two on each floor, there is a frost back on one of the evaporators on the fourth floor while the seven other evaporators are short of refrigerant on the same riser. Other risers nearer and also farther away from the machine are operating satisfactorily. The question is, please explain why the frost back occurs on the fourth floor?

ANSWER. My opinion on the above problem would be as follows:

The evaporator frosting back from the top floor may be frosting back as a result of low refrigerant on the riser. I explain this by stating that the gas and liquid entering the boiler at high velocity has a tendency to carry through or short circuit to the return due to violent foaming caused by the large quantity of vapor in the mixture. This experience is more or less common with normal float types but with the Peerless type of cast iron evaporators we meet, it is rarely if ever found. I believe that what is more apt to be the case is that the boiler frosting back has a defective needle or seat or that they are gummed up so they do not move freely, or as we have commonly found the float valve is such that it binds in the boiler. The fact that riser is showing signs of low refrigerant while the rest of the system seems to have plenty of liquid is another thing that we have experienced. We had such a system to which we added sufficient gas so that we knew that was not our trouble. We recommend that the only reason refrigerant could not be forced up one riser while the others were working all right would be that riser was in a warmer location than the others and would require a higher pressure to keep the refrigerant from vaporizing in the riser than did the others. Setting the water valve for a higher head pressure eliminated our difficulty.

The only way refrigerant can be forced up a riser with no air in the system is to have the condensing temperature warmer than any part of the riser and for approximately every 2½ feet of rise, the temperature of the riser will be one degree lower. If the riser is in a warm location, it will be cooled by evaporation of refrigerant in the riser passing through the float valves as a vapor. If the riser is warmed considerably, the refrigerant will evaporate in the riser as fast as the float valves will let the vapor through so that the riser does not cool sufficiently to allow the liquid to rise and consequently the liquid may never get as high as the upper boilers. One other common fault of floats is, of course, a leaky float ball or maladjusted balance spring.

REFRIGERANT CONTROL

(Continued from page 15)

and each thermostat operates a magnetic valve. The thermostats, magnetic valves, and pilot switches are wired as described above. The temperature of each room is too high at the start and, therefore, the thermostats make contact and open the valves. When the valves are open, the pilot switches are closed, the circuit to the motor starter is completed and the compressor starts up. Let us assume that the loads in the two rooms are uneven.

Then the room with the light load will come down to temperature first and when it does the thermostat trips, breaking the circuit to the magnetic valve. Although the pilot switch of this valve is now opened, the compressor continues to run because the pilot switch of the second valve is still completing the circuit to the compressor motor. When the second room comes down to temperature, its thermostat closes the magnetic

(Continued on page 21)

NEW MECHANICAL DEVICES
Service Tools and Special Equipment

Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer.

REFRIGERANT CONTROL VALVE

THE cross section view, Fig. 1, shows the mechanical features of the Automatic Products Co. valve for the control of refrigerants to individual evaporators. The body is a brass forging. A monel metal valve stem closes against a special alloy seat which is pressed into the body. This valve stem is

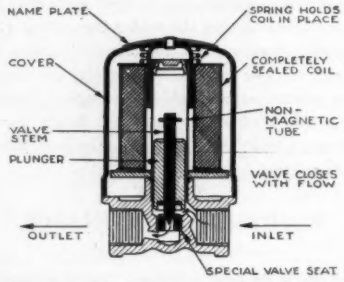


FIG. 1. CROSS SECTION OF AUTOMATIC VALVE.

opened and closed by the action of a movable plunger. As the surrounding coil is energized, the plunger is forced upward. It is not attached directly to the valve stem but moves a short distance and gains momentum before it raises the valve stem itself. This is known as an impact type plunger and accounts for the fact that it will open easily and efficiently under high pressure. The valve stem closes with the flow of the liquid forming a tight seal.

The plunger and valve stem "float" in the coil and do not touch the top of the guide tube. The plunger and valve stem are enclosed in a tube which is sealed tight so that no leakege can occur. Both the tube and the valve stem are non-magnetic so that no mineral particles can be attracted which might prevent a tight shut-off.

The coil is completely sealed with a plastic material to keep out moisture.

The cover is black crackle finish and encloses the entire coil. A name plate at the top gives the necessary rating information.

Power consumption is approximately 12 watts. The coil is so constructed that the current may be kept on indefinitely without danger of overheating. Constant current is required to keep the valve open. As soon as the circuit is broken, the valve drops shut.

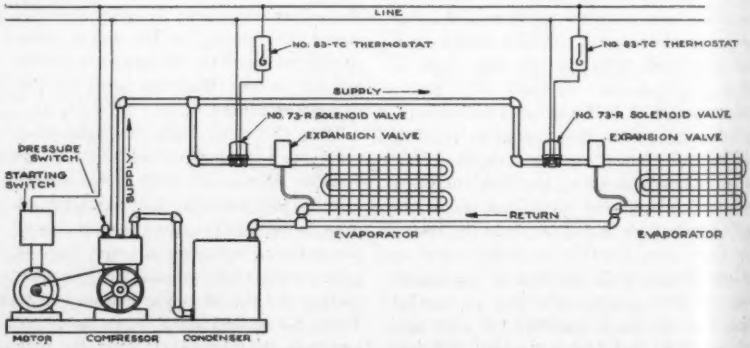


FIG. 2. APPLICATION OF VALVE CONTROLLING REFRIGERANT TO INDIVIDUAL EVAPORATORS.

Application of Valve

The solenoid valve is designed especially for the control of methyl chloride, Freon, and other refrigerants which will not attack the materials used in the construction of the valve parts.

There are several applications of this valve, foremost of which is the use as shown by Figure No. 2. Here the valve controls the flow of the refrigerant to individual evaporators, all of which are connected to the same compressor unit. This application

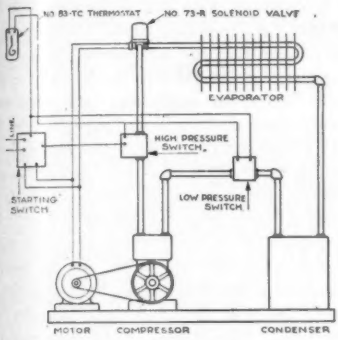


FIG. 3

is utilized in controlling the temperatures in several different refrigerators such as may be found in grocery stores, butcher shops, florists, or drug stores. Each storage box is individually controlled absolutely independent of the other installations. And if need be, additional installations can be added without affecting the present installation.

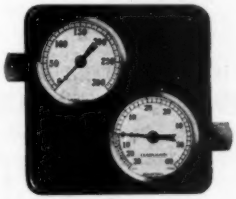
This same individually controlled system is used in the air conditioning field, where individual evaporator cabinets are located in different rooms, all working off a central compressor unit. Cabinets may be added or taken off without upsetting the installation.

It is also used on a liquid refrigerant line for the control of the condensing unit, as shown by Figure No. 3. In this method of control, the solenoid valve is placed in the liquid line and connected to the compressor side of the control switch and is operated from a low pressure switch on the condensing unit. This low pressure switch can be set to cut out at 7 to 8 pounds and cut in at 34 to 36 pounds pressure. When operated in this manner, the compressor partially pumps down the evaporator at each operation, and, maintaining a low pressure in the condensing unit reduces the amount of seal leakage trouble.

It can also be used on evaporators up to approximately three tons on Freon and sulphur dioxide systems and up to about six tons on methyl chloride.

SIAMESE TEST GAUGE

THE Marshalltown Mfg. Co., Marshalltown, Iowa, have announced "The Siamese Test Gauge," a combination of the high pressure and compound gauge in a convenient, serviceable case designed especially for the servicing of household machines.



NEW MARSHALLTOWN COMBINATION GAUGE.

The gauges are assembled in an attractively finished square case approximately 3¼" square. Connections to both gauges are ⅛" female pipe thread. Crystals are non-breakable. If it should become necessary at any time to reset pointers to zero, this is quickly accomplished by removing cover and turning dial until pointer is in proper position.

The instrument is enclosed in a neat leatheroid container to protect it in the service man's kit.

KRAMER UNIT COOLERS AND WATER COOLED CONDENSERS

THE Trenton Auto Radiator Works of Trenton, New Jersey, manufacturers of Kramer refrigeration products, have recently announced and released literature on its improved line of unit coolers. The important feature of the new line is the manifolding of the larger units for use in con-

junction with Freon and for greater than 20° difference air to refrigerant, and its application to commercial comfort cooling installations as well as for process cooling.

The Kramer unit cooler is manufactured entirely of non-corrosive materials, the coil being of all copper construction with a hot tin dip finish, the housing of all brass construction.

The drip pan likewise is of all brass construction, cork insulated.

Announcement is also made of a complete line of water cooled condensers for use in conjunction with machines of from ⅓ H.P. to 3 H.P. The water cooled line is in addition to air cooled condensers and liquid receivers already manufactured by this company for the refrigeration service trade.

Literature on these new developments is available on request.

S S S

NEW SYSTEM FOR TRUCK REFRIGERATION

AT intervals during the past eighteen months, various commercial publications have referred to a revolutionary new development in refrigerated trucks being carried out on the Pacific Coast by a subsidiary of the Shell Union Oil Co. This development work is now completed, and, as a result of a recent agreement between the Shell Oil Co. and the McCord Radiator & Mfg. Co., of Detroit, the latter has become the exclusive licensee in the United States for the manufacture and sale of this system, in which Petrogas, a Hydrocarbon distillate similar to Propane, is used as a fuel and refrigerant.

The two ton Dodge truck (size of refrigerating compartment 6 x 6 x 11 ft.) in the service of S. Loewenstein & Son, Packers, Detroit, shown in the photograph reproduced herewith was one of the first trucks to be equipped with this system east of the Rockies. By referring to the photograph, it will be seen that the fuel, carried as a liquid at a pressure of 135 lbs. in the twin cylinders, "A," each containing approximately twenty-three gallons, is led upwards to the heat exchanger, "B," where the atmospheric heat of the liquid is removed. It then passes through the expansion valve, "C," from which it issues into the evaporator or cooling unit, "D," as a saturated gas at a pressure of approximately 5 lbs. In its conversion from a liquid to a gas, heat absorption is effected and the truck body thereby refrigerated. The surface of the evaporator is so proportioned that the gas leaves in a dry state and passes through the heat exchanger, "B," where it absorbs the atmospheric heat of the incoming liquid fuel as

NEW TYPE OF REFRIGERATED TRUCK.

above mentioned, and then passes through the diaphragm regulating valves, "E" and "F," where, in two stages, the pressure is reduced to atmospheric. The dry gas then passes to the McCord mixing valve and thence directly to the intake manifold.

A number of advantages are claimed for Petrogas in its dual role of fuel and refrigerant. Considered as a fuel alone, it is said to be economical, since it is marketed at approximately the same price, on a performance basis, as regular gasoline. It is further economical in that its use results in the elimination of crank-case lubricating oil dilution, thus effecting a saving of approximately fifty per cent in oil costs.

Dry Gas

Being a perfectly dry and homogeneous gas when it enters the manifold, even distribution to each cylinder is assured and the "hot spot" can be dispensed with, thereby permitting a less expanded charge of gas to be drawn into the cylinders than in the case of a gasoline-air mixture. As this fuel has a final boiling point of minus 40° F. and becomes a dry gas at higher temperatures, motor starting is never dependent upon a change in mixture, and is, in fact, easier than with the highest test gasoline.

Having an extremely high octane rating, it can be used advantageously on very high compression motors. Even with motors of ordinary compression, however, high efficiency is claimed through its almost perfect combustion. This, in turn, is a decided factor in reducing maintenance costs, as it is now known that the wear on cylinder walls and on valves is less due to abrasion than to chemical deterioration of the metal caused by incomplete combustion.

Advantages of Gas

The advantages of this type of gas as a refrigerant are obvious, since the refrigeration effect is obtained as a by-product and at no cost. Maintenance cost in the system is reduced to a minimum as there are only a few valves to consider and no moving parts. It should be noted in connection with this system that the amount of refrigeration which is created is in direct proportion to the quantity of fuel consumed by the motor and is equivalent to 180 to 185 B.t.u.'s per pound of fuel.

On runs where the motor is under load or partial load for the greater part of the time, an excess of refrigeration may be produced, but such excess may be controlled thermostatically in a simple manner. On runs where many stops are made, where the doors of the refrigerator compartment are opened a number of times, and where the motor is idle for long periods, the refrigeration is still adequate, according to a test run made by a Loewenstein truck on June 4, 1934. On this test, the truck carried 5,261 lbs. and travelled 120 miles in 410 minutes elapsed time. The engine was under load 280 minutes, made sixteen stops and was idle 130 minutes. With an outside temperature of 85 to 94° F., a temperature of 42 to 48° F. was maintained.

S S S

REFRIGERANT CONTROL

(Continued from page 17)

valve in its feed line and refrigerator stops. As the second valve closes, its pilot switch opens and breaks the circuit to the compressor motor. The compressor then shuts down until further refrigeration is required in either of the boxes. Should the load on one of the boxes be increased the temperature would rise, the thermostat complete the circuit to the valve, and the valve would open. When the valve opens, its pilot switch closes the motor circuit and the compressor again starts up. In this manner a constant temperature is maintained in each room and the compressor is only operated when refrigeration is actually needed.

Installation

The proper installation of the magnetic liquid valve when used in connection with a thermostatic expansion valve is shown in Figure 5. This valve should never be installed between a pressure reducing valve and the low side coils. This would cause a pressure to build up between the reducing valve and the magnetic valve and the consequent expansion taking place at the mag-

(Concluded on page 24)

CHART NO. 14

REMEDY CHART*

HERKIMER REMEDY CHART:—The Herkimer Remedy Chart following may assist the service mechanic in repairing in a systematic manner.

CAUSES → / COMPLAINTS ↓	A	B	C	D	E	F	G	H
	Orifice Too Small	Inefficient Compressor	Undercharge	Air In System	Orifice Too Large	Overcharge	Thermo Bulb Too Warm Pres. Switch Too Low	Thermo Bulb Too Cold Pres. Switch Too High
(1) Long on—Bad or Poor Refrigeration	Remove Obstruction or Adjust	Overhaul Compressor	Charge	Purge?	Adjust Orifice See Ex. Lf	Purge High Side Float & Capillary Tube		
(2) Long On—Normal Refrigeration				Purge?		Purge	Reset Switch	
(3) No Ice Cubes	Remove Obstruction or Adjust	Overhaul Compressor	Charge		Adjust Orifice			Reset Switch
(4) Too Cold							Reset Switch	
(7) Suction Line Covered with Frost					Adjust Orifice	Purge High Side Float & Cap Tube	Reset Switch	
(8) Short Cycling	Clean Float Note: Occurs with Pres. Switch		Charge High Side Float with Pres. Switch				Reset Switch	Reset Switch
(9) Electric Bills Too High (1-2-4)	Adjust Orifice	Overhaul Compressor	Charge	Purge	Adjust Orifice	Purge	Reset Switch	

Exception (LF)—Undercharged low side float gives higher back pressure but no frost back.
Exception (C)—With capillary tube overcharge gives frost back with high back pressure.

*This Herkimer Remedy Chart is compiled to assist the Service man to repair refrigerators in a systematic manner

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Cut out along outer line and insert in binder for ready reference.

FOR LEATHER BINDER WRITE TO H. T. McDERMOTT, SECRETARY REFRIGERATION SERVICE ENGINEERS' SOCIETY 433 N. WALLER AVE., CHICAGO, ILL.

The REFRIGERATION SERVICE ENGINEER

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Official Organ
REFRIGERATION SERVICE ENGINEERS' SOCIETY

WHITHER PROFITS?

LET'S face the facts—it is an old story but the sooner the situation is squarely faced, the quicker and surer the cure. The condition we refer to seems more pronounced during the busy summer season than at any other time of the year, which seems to be perfectly logical.

After operating at peak capacity, oftentimes on an average of twelve or fourteen hours a day, many service men find that at the end of the season, while satisfactory volume of work has been accomplished for the size of their organization, the profit secured from the work done does not in any manner compensate for the time and effort. The question is then asked if the business of servicing can be made a profitable one.

Knowing the method of operation of some organizations and their laxity in the keeping of cost records and other records of a vital nature to any business, about the best answer that can be given to this all important question is that if any business were conducted in a like manner, it probably would show just as little or no profit.

This subject is not new. It has been discussed before in these columns. Not only is actual labor and material cost sometimes forgotten because of the laxity in keeping records, but it is not an isolated case that oftentimes accounts are absolutely forgotten about where money is owing.

It must be definitely realized that the keeping of records, no matter how busy one may be, is just as important a part of the servicing business as doing a satisfactory job.

S S S

THE NEXT BIG REFRIGERATION MARKET

EVERY one apparently is of one opinion that air conditioning is the next big refrigeration market. How fast this market for popular priced units for home use may develop is just a question of perfecting a satisfactory job to command a price field similar to the development of the domestic household refrigerator field.

This summer has thus far witnessed a tremendous increase in air conditioning installations. The business has been principally the larger installations. Business institutions, realizing that summer business is a matter of patrons' comfort, have installed air conditioning as one of the major improvements in the bid for increased business.

Theatres unquestionably contributed to the pioneering development of air conditioning, and today a theatre can hope for very little patronage if it does not tell the world that it is "always 70°—no higher inside."

Deparment stores have adopted air conditioning as essential to their business and probably in the number of installations, restaurants have been quick to recognize the necessity of providing the utmost comfort for their patrons. Railroads, recognizing that some drastic measures had to be adopted in order to recapture some of their lost business from other modes of travel, have been rushing into air conditioning, changing over their equipment as rapidly as possible and capitalizing on this feature to encourage greater rail travel.

A complete office building, the first installation of its kind completely air conditioned from a central system, which required the remodeling of a comparatively new build-

ing, has been recently completed. Several of the prominent hotel chains are now, in addition to their various dining rooms, writing rooms and other meeting places, air conditioning guests' rooms. It has even been prophesied that it may be only a short time before automobiles may be fully air conditioned.

In summing up the entire picture, with all the refrigeration equipment being installed to take care of the development of air conditioning, it is obvious that the business of refrigeration servicing has a most encouraging outlook, and will require the services of a large number of men qualified to keep this equipment operating at its highest efficiency.

WARRANTY AND SERVICE POLICY ADOPTED BY REFRIGERATOR MANUFACTURERS

IN the Refrigeration Industry Code, which is the Supplementary Code of Fair Competition to the National Electrical Manufacturers' Association Code, and which has been adopted as of June, 1934, the Warranty and Service Policy, as defined in the Code, is as follows:

Article V—Warranty and Service Policy

(a) Except as special provisions shall from time to time be approved by the Supervisory Agency for this Subdivision and by the Administrator, no employer shall give any express warranty which extends his responsibility for refrigeration equipment manufactured and/or sold by him beyond one year from the date upon which such refrigeration equipment is installed on the premises of the original purchaser, or which extends his responsibility for such refrigeration equipment beyond the replacement or repair of such equipment which shall be defective in material and/or workmanship.

(b) Employers may develop individual plans for providing replacement units in case of failure after the expiration of the warranty, provided:

(1) Advertising and sales promotion shall contain no representation which, by reference to any term of years or by the use of trade terms or phrases not readily understood by the public, or otherwise, would cause any person to assume that an extension of the uniform warranty is intended, nor shall any representation be made in advertising or sales promotion which will in any way tend to confuse such unit replacement plans with the warranty;

(2) In any case in which an employer's policy with respect to unit replacement is referred to in advertising or sales promotion, such advertising and sales promotion shall state clearly the amount which has been added to the complete unit price to cover the average cost of unit replacement.

(c) The term "original purchaser" as used in this Article shall be deemed to mean that person, firm, association or corporation for whom the refrigerating equipment referred to therein is originally installed; or the bona fide assignee of that person, firm, association or corporation.

(d) The provisions of this Article shall not be subverted or evaded, directly or indirectly, by any manufacturer resorting to any form of advertising not in harmony with the letter and spirit of this Article or subterfuges of any kind. On the other hand, no provision of this Article shall be construed to limit or relieve from liability arising out of any warranty implied by law.

REFRIGERANT CONTROLS

(Continued from page 21)

netic valve seat would cut and score the pin and seat and cause the valve to frost. The life of the valve might then be materially reduced. It is always advisable to install a filter ahead of the valve. If the magnetic valve is used with an automatic expansion valve, one filter installed ahead of both valves will suffice.

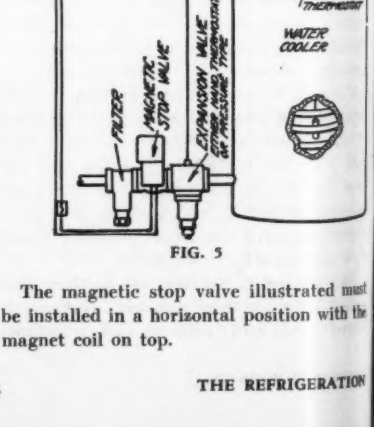

FIG. 5

The magnetic stop valve illustrated must be installed in a horizontal position with the magnet coil on top.

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

First Annual Convention Announced

Chicago Selected as Meeting Place for First Convention Dates October 11, 12 and 13

THE Board of Directors announce the time and place of the first annual convention of the Refrigeration Service Engineers' Society. Chicago has been selected as the city and the dates are Thursday, Friday and Saturday, October 11, 12 and 13.

The selection of the convention city was determined after careful consideration. It was the consensus of opinion that Chicago, being centrally located for the majority of members, with the added attraction of the Century of Progress, would undoubtedly influence the greatest number for the first convention. Then, too, special railroad rates will be in effect from all parts of the country.

In making the announcement at an early date, the officers and Board of Directors hope that the members of the Society, who are planning to attend the Century of Progress Exposition, will plan their trips to coincide with the convention dates. The selection of the time is made because it will undoubtedly be the most convenient to the majority of members, immediately after the busy refrigeration season and in advance of the closing of the Fair.

An interesting educational program will be arranged and it is planned to confine sessions to the morning only, in order that those in attendance may have the afternoon free. Further announcements as to the educational program will be made at future dates. It is hoped that as many members of the Society as may be planning to come to Chicago will arrange their visit to be in attendance at this first annual convention.

In addition to transacting the business of the Society, papers and educational discussions will be presented by the foremost authorities in the industry who will be invited to present their ideas and views of this convention. This program will be of pertinent interest to every service engineer. The three-day convention session will be an outstanding educational conference.

Our National Educational Program

By GEORGE H. CLARK
Chairman, National Educational and Examining Board

ONE of the principal objects of the Refrigeration Service Engineers Society as set forth in the Constitution and by-laws is "to further the education and elevation of its members in the art and science of refrigeration engineering with special reference to the servicing and installation of domestic and small commercial equipment." The Educational Committee is therefore called upon to get busy with such a program.

Our business of refrigeration service requires some knowledge of several arts in themselves. The service man should be a plumber, an electrician, a chemist, a physicist, and a diplomat. The service man should be enough of a plumber to trace out water lines on a job, to install water lines, and should be able to recognize and distinguish pipe threads upon examination. His knowledge of electricity should be such as to enable him to make such motor repairs as are practical on the job, he must be able to locate motor grounds, shorts and allied troubles as well as be able to make repairs and locate troubles in relays, motor starters, controls, and wiring. The chemistry of refrigeration concerns itself with a knowledge of the action of the refrigerants upon the metals in the system, the results of mixed refrigerants, refrigerants mixed with air and moisture, and the actions of the various refrigerants and mixtures on the oils of the system at the various temperatures that obtain. The physics or thermodynamics of heat, temperatures, pressures; the condensation and evaporation of refrigerants and a knowledge of the temperature pressure relations of a refrigerant are among the most important things to understand.

If a man has a thorough understanding of these things and he is a good mechanic he should be able to repair a refrigerating system. If the man can repair a refrigerating system with no lost motion in analyzing and repairing he will be a good service man if he is diplomat enough to get along with the customers. Customers personalities differ greatly and we must be able to adapt ourselves to them. Some customers like conversation with their service and like to have the trouble explained to them. Others hold everything you say against you. There are times to be "tough" and times to be sympathetic and the man who guesses right the greatest number of times is the man who gets along best with the customers.

Engineering has been defined as the application of technically educated common sense. Neither the common sense nor the technical education are enough in themselves. The successful engineer must have both. Common sense is a gift, technical education is an acquisition. The Educational Committee does not find itself able to make the gift to anyone but it hopes to offer a means to acquire the technical education. It proposes to issue to all Society members in bulletin form a series of discussions covering the fundamentals of the types of refrigerating systems that come within our scope. Further bulletins will discuss the various devices found in these refrigerating systems and common sources of trouble and their remedy. It is hoped that the complete series of bulletins will form a suitable text for the business of refrigeration service. It is planned that each chapter of the Society will have a general discussion on each bulletin at its regular meeting. In this way the educational programs would have a more definite plan and these programs would be coordinated throughout the country.

* * *

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We have a high regard for your REFRIGERATION SERVICE ENGINEER and we would greatly miss same if we had to go without it.

MEETINGS OF CHAPTERS

St. Louis Chapter No. 1
Meeting of June 14

THE regular meeting of St. Louis Chapter was held at the show rooms of the Brown Supply Co., with President A. J. Robins presiding.

Mr. Bob Weicker, of the Brown Supply Co., and a very active member of the local chapter, was the speaker of the evening. Both 1933 and 1934 Grunow units were dissembled during the course of his talk, to illustrate the various service problems step by step. Mr. Weicker also brought out many salient points and explained the features of the Grunow refrigerator. At the conclusion of his talk, an open discussion was participated in by the members, and Mr. Weicker answered questions which were presented.

President Robins announced the purpose of the special meeting, which was to be held on June 16, at which time St. Louis Chapter was to receive its charter.

St. Louis Chapter Receives Its Charter

A SPECIAL meeting of St. Louis Chapter was held at the Hotel Saum, on Saturday, June 16, with President A. J. Robins presiding. Mr. Robins explained briefly the purpose of this special meeting, and in addition gave a resume of the educational program for the balance of the year.

Mr. Fred Myers, who was recently appointed as a representative of St. Louis Chapter on the National Educational and Examing Board, spoke briefly on educational activities.

Mr. George Monjian, president of the George Monjian Co., Chicago, and a member of Chicago Chapter, was introduced and gave a comprehensive outline of the service problems in his city. He answered many questions of particular interest to the members of St. Louis Chapter.

Following this, President Robins called upon Mr. H. T. McDermott, National Secretary, and stated that later on in the evening, after the election of officers, the formal presentation of the charter would be made. The National Secretary in responding complimented the chapter on its progress thus far.

President Robins then stated that the next order of business would be the election of

permanent officers for the chapter for the ensuing term, and that in choosing the officers, it should be borne in mind that a certain responsibility was assumed and that accordingly the officers which would be elected should be willing to give of their time in the interest of the advancement of St. Louis Chapter.

Election of Officers

Proceeding with the election of officers, upon motion made and regularly seconded, it was the unanimous opinion of those present that, in appreciation of the splendid work which the temporary officers had accomplished during the formative period, all officers should be elected to continue to serve in their respective positions. However, due to the press of business, Mr. Plesskott stated that he could not conscientiously devote sufficient time to the duties of secretary to accept that office again, but he offered every cooperation possible for the future growth of the Society.

The election resulted in the following selection of officers for the balance of the year:

PRESIDENT—A. Jerome Robins.
1ST VICE-PRESIDENT—E. A. Plesskott.
2ND VICE-PRESIDENT—J. A. Link.
SECRETARY—Russell E. Davis.
TREASURER—Leonard L. Vollman.
CHAIRMAN OF EDUCATIONAL COMMITTEE—Fred W. Myers.
BOARD OF DIRECTORS—F. J. Eckhold, Raymond J. Pennington, Clyde L. Williams.

Charter Presentation

After the election, President Robins called upon Mr. H. T. McDermott, National Secretary, who explained in full the objects of the Society, in a brief address, before the presentation of the charter, and then proceeded with the obligation of the members and the formal presentation of the charter to President Robins.

Motion was made and seconded that during the months of July and August, meeting be held on the second Thursday of each month, only, and regular meetings resumed in September.

Upon adjournment of the meeting, the members participated in a buffet luncheon.

Chicago Chapter No. 1

Meeting of June 12

CHICAGO Chapter held its meeting of June 12 in its new permanent home, with a representative attendance present. Many matters of considerable interest to the chapter members were discussed, and after disposing of the usual business, Mr. Cooper, of the Thermal Units Co., gave an interesting talk on "Thermal Units, Unit Coolers and Coils." His talk was illustrated with actual products as manufactured by the company, which were on display for the inspection of the members.

Mr. George Monjian, of Chicago Chapter, introduced Mr. Joseph Horak, who operates an extensive business in Czechoslovakia, and visited Chicago Chapter before his return to his native country after a business trip through the United States. Mr. Horak received his training on refrigeration servicing several years ago under Mr. George Monjian.

Meeting of June 26

With President Fowler presiding at the meeting of June 26, the usual matters were disposed of, and an educational program of considerable interest to the members present was then presented.

Mr. Ivar Skipple, a member of Chicago Chapter, gave an actual demonstration and a complete talk on a "Little Giant" small commercial ammonia compressor. Mr. Joseph Corso furnished the machine and Mr. Skipple had the equipment hooked up, so that an actual running demonstration in conjunction with his talk was given.

The members were of the one opinion that this type of educational program and actual demonstration is of considerable value and interest to the members and the educational program for future meetings will be carried out along these lines.

CHICAGO CHAPTER MOVES INTO ITS NEW HOME

GREATER Chicago Chapter No. 1 has secured a permanent home for its meetings, which will also include a refrigeration exhibit. The first meeting in the new quarters was held on June 12. The membership voiced its approval of the new quar-

ters and its acknowledgment of the endeavors of the officers of Chicago Chapter for their work in preparing the new location for the chapter meetings.

The meeting place is conveniently located to transportation, 2111 W. Jackson Blvd., which has ample parking facilities, and is located on one of the main east and west thoroughfares of the city. When finally completed, accommodations for seating approximately 200 will be provided.

Refrigeration Exhibit

The permanent refrigeration exhibit is intended to provide for the display of machines and accessories so that the members of Chicago Chapter will have the opportunity of becoming familiar with the various types of equipment which they come in contact with during their everyday work.

In addition, it is planned to have a reference library, which will be maintained for the convenience of the members of the chapter, where catalogs, service information and other data will be kept for reference of the members. It is hoped that in an early issue of THE REFRIGERATION SERVICE ENGINEER, photographs will show the facilities that Chicago Chapter now enjoys.

The chapter meets every second and fourth Tuesdays of the month and extends a cordial welcome to all service men to attend any of its meetings.

HOWELL MOTOR DISTRIBUTOR

THE Servicemen Supply Co., 1819 Broadway, New York City, are acting as distributors for the Howell Motor Co., of Howell, Michigan, and also for the Gates Belt Co., of Denver, Colo., on refrigerator belts. These are two new products which the Servicemen Supply Co. have recently added to their list of refrigeration accessories for service men.

Paul Lebet

Alabama

During the past year, I not only enjoyed reading your magazine but have also found it most instructive. Kindly enter my subscription.

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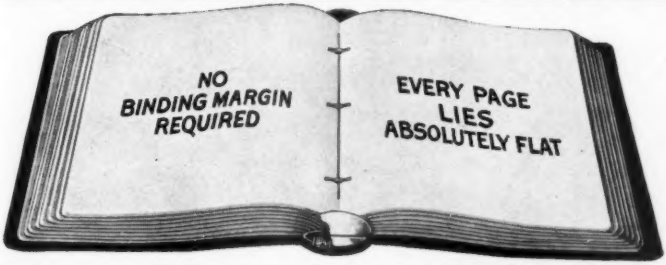

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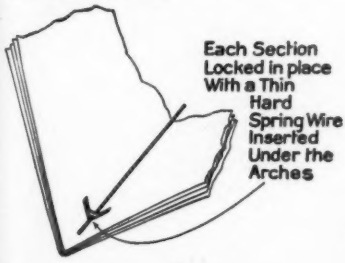

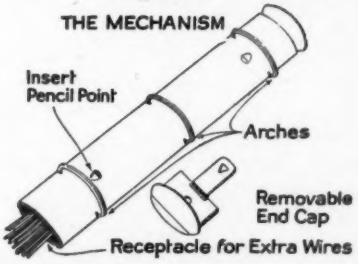

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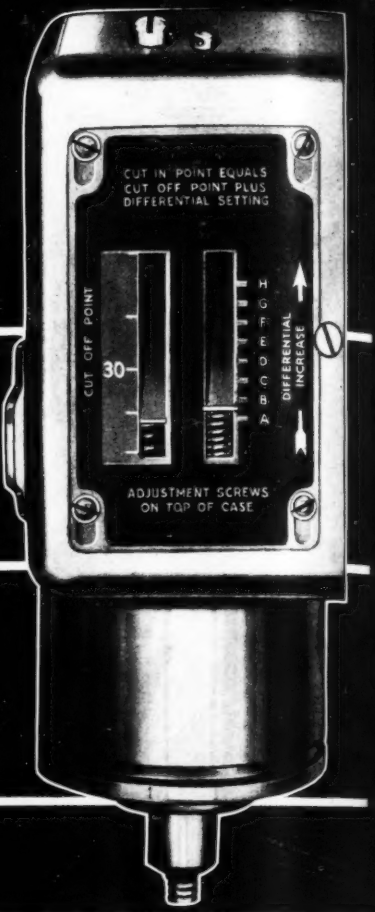

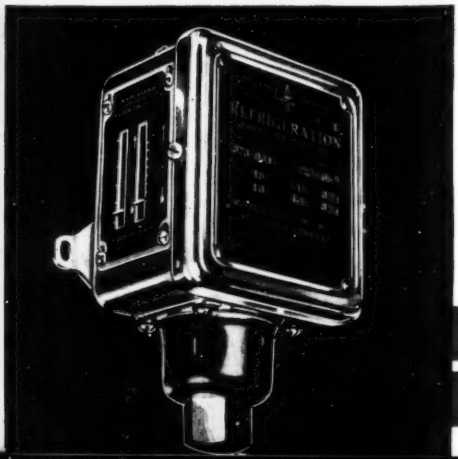

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